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PSYCHOLOGICAL AND BEHAVIORAL RESPONSES TO A
CHEMICAL AND BIOLOGICAL WARFARE ENVIRONMENT:
FINAL RECOMMENDATIONS

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DEPARTMENT OF PSYCHIATRY
F. EDWARD HEBERT SCHOOL OF MEDICINE
UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
BETHESDA, MARYLAND 20814-4799

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<p>In the present world climate, chemical and biological warfare (CBW) is a realistic threat to U.S. Air Force personnel. Medical care for conventional and chemical casualties in the CBW environment requires individual protection, group protection, and decontamination as well as supply and patient transfer through contaminated areas. CBW stirs terror in individuals both because of the particular psychological fears it arouses and the tremendous difficulties presented by the need to continue to operate after an attack. Recommendations derived from CBW research cover the issues of command (e.g., maintenance of communications and morale, and command policy in the face of mass casualties), medical care (e.g., alcohol use as a risk factor in CBW environment, low dose exposure, internal SCPS-M management, and unique stressors of the CBW environment), performance (e.g., group responses to contamination and isolation effects on performance), and training (e.g., unit reconstitution following heavy losses, "grief leadership," buddy care, development of first aid capability within squadrons, crews, and work units, maintenance of cohesion in flying and ground (Cont'd)</p>					
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crews, and training for commanders in command posts). These recommendations should serve as the basis for the development of command policy, training scenarios, medical command and medical care procedures and the direction of future research in this area. (201-7)

**PSYCHOLOGICAL AND BEHAVIORAL RESPONSES TO A
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SENIOR PROJECT SCIENTISTS

Robert J. Ursano, M.D.
Col, USAF, MC, FS
Professor
Associate Chairman
Department of Psychiatry
Uniformed Services University
of the Health Sciences
4301 Jones Bridge Road
Bethesda, Maryland 20814

Harry C. Holloway, M.D.
Professor and Chairman
Department of Psychiatry
Uniformed Services University
of the Health Sciences
4301 Jones Bridge Road
Bethesda, Maryland 20814

Craig H. Llewellyn, M.D.
Professor and Chairman
Department of Military Medicine
Uniformed Services University
of the Health Sciences
4301 Jones Bridge Road
Bethesda, Maryland 20814

David R. Jones, M.D.
Clinical Professor
Department of Psychiatry
Uniformed Services University
of the Health Sciences
1 Clermont Court
Oakwell Farms
San Antonio, Texas 78218-1741

EXECUTIVE SUMMARY

In the present world climate, chemical and biological warfare (CBW) is a realistic threat to U.S. Air Force personnel. Medical care for conventional and chemical casualties in the CBW environment requires individual protection, group protection, and decontamination as well as supply and patient transfer through contaminated areas. CBW stirs terror in individuals both because of the particular psychological fears it arouses and the tremendous difficulties presented by the need to continue to operate after an attack. Unique elements of the U.S. Air Force mission affect operations in the CBW environment and the potential for casualties:

- *Presence of fixed bases
- *Importance of cognitive tasks
- *Operations in the contained environment of aircraft
- *Dependent populations in close proximity
- *Limited previous exposure of Air Force members to mass casualty situations
- *Importance of crew/group functioning for mission performance

In order to better understand the behavioral and psychological factors in the USAF CBW environment, this project developed a computerized database relating to behavioral and psychological responses to high stress and chemical environments and their effects on performance and health. Secondly, this project made on-site observations of the SCPS-M and its functioning in an operational testing environment. Thirdly, the project scientists convened experts in small group discussions and two major conferences.

Recommendations derived from these data are included in this report. These recommendations cover the areas of command, medical care, performance, and training. There is substantial overlap among these recommendations. The recommendations cover the following issues:

- ***Command:** Maintenance of communications, troop concerns under CBW attack, maintenance of morale, problems of return to duty following CBW exposure and combat stress, command policy in the face of mass casualties.
- ***Medical care:** Alcohol use as a risk factor in CBW environment, low dose exposure, internal SCPS-M management, exposure to mass casualties, body disposal, unique stressors of the CBW environment, training for medical care of mixed casualties.
- ***Performance:** Group responses to contamination, long-term consequences of nerve agent exposure, isolation effects on performance, cognitive alterations under high stress.
- ***Training:** Unit reconstitution following heavy losses, "grief leadership," maintenance of communication, maintenance of work/rest cycles, familiarization of troops with SCPS-M, buddy care, "failure mode" evaluation of SCPS units and procedures, importance of realistic training, development of first aid capability within squadrons, crews, and work units, maintenance of cohesion in flying and ground crews, training for commanders in command posts.

These recommendations should serve as the basis for the development of command policy, training scenarios, medical command and medical care procedures and the direction of future research in this area.

TABLE OF CONTENTS

Executive Summary.....	vii
Final Recommendations.....	1
Command.....	4
Medical Care	9
Performance.....	14
Training.....	17

**PSYCHOLOGICAL AND BEHAVIORAL RESPONSES TO A
CHEMICAL AND BIOLOGICAL WARFARE ENVIRONMENT:
FINAL RECOMMENDATIONS**

In the present world climate, chemical and biological warfare (CBW) is a realistic threat to the U.S. fighting force. Even in such a toxic environment, the U.S. Air Force will have to operate from its fixed bases, performing highly technical tasks. The CBW environment will produce a high stress burden for troops and medical care delivery teams. The demands of this environment are both similar to and distinct from other combat, disaster, and high stress environments.

The medical care for conventional and chemical casualties in the CBW environment requires individual protection, group protection, and decontamination as well as supply and patient transfer through contaminated areas. In addition, operation in a contained environment for extended periods of time will be required. The Survivable Collective Protection System-Medical (SCPS-M) plays an important role in this task.

CBW itself stirs terror in individuals both because of the particular psychological fears it arouses and because of the tremendous difficulties presented by the need to continue to operate after an attack. Behavioral and psychological responses to the CBW environment may disrupt performance and place the individual or group at increased risk. Medical diagnosis is complicated by the fact that many of the behavioral and psychological responses to CBW are similar to signs and symptoms of nerve agent contamination and combat stress. Recent world events have highlighted the complex and critical effects of combat stress during sustained intermittent combat on cognitive processes. These are the same cognitive tasks which would also be affected by nerve agents.

Unique elements of the U. S. Air Force mission affect operations in the CBW environment and the potential for casualties. These include:

First, the Air Force operates from fixed bases. Runways are prime targets and cannot be moved. Similarly aircrew and support personnel are a fixed and vulnerable target.

Secondly, slight degradations of cognitive performance can critically impair aircrew and ground crew dealing with sensitive avionics, weapons, and fuels. Small team work groups are a prominent part of the Air Force environment. Thus, the loss of one member may represent a 20% to 40% loss of work capacity which may be in a critical, nonredundant area.

Thirdly, the contained environment of aircraft produces particular dilemmas in the CBW environment. There are limited methods of decontamination within aircraft since most decontamination methods cannot be easily used around sensitive avionics. Thus, chronic low dose exposure will be a problem. The problems of chronic low dose exposure and the long term effects of these toxic agents are difficult issues. This issue is compounded by the fact that combat fatigue and chronic nerve agent poisoning can look very similar.

Fourthly, because air bases are fixed, they frequently have dependent populations in close proximity. Concern for families is always a part of combat stress. The modern CBW combat environment with extended areas of combat puts families at increased risk. Communications within the extended combat area will be unreliable. Aircrew health and performance can be expected to be affected by such family stress.

Fifthly, most Air Force members have limited previous exposure to the death and dying associated with mass casualties. The CBW environment makes the stress of exposure to severe injury, dying and death a certainty. In the CBW environment, all aircrew support personnel, base operations, and families located near the base will be exposed to this trauma of war.

Lastly, issues of unit cohesion (crew functioning and work group supports) which form around shared tasks and over long periods of time are critical to mission performance. The effect of the CBW environment, protective gear, and shelters on unit cohesion and crew performance is uncertain at best. But available data support the idea that, in the absence of appropriate preparation, unit cohesion and performance will be markedly disrupted.

In order to better understand the USAF CBW combat environment, this project:

1) Developed a computerized database on the psychological stresses of chemical and biological warfare. This database broadly examines the biopsychosocial stressors and responses to CBW through research in analogous areas in which relevant conclusions can be drawn. This database includes references and abstracts of articles in areas such as small group performance, aerospace stress, combat stress responses, and the effects of protective gear, protective shelters and living in contained environments. 2) Made on-site observations of the SCPS-M and its functioning in an operational testing environment at Dayton, Ohio. 3) Convened experts for small group discussions and consultation and for two major conferences. These seminars and conferences have resulted in six volumes: 1) Individual and Group Behavior in Toxic and Contained Environments; 2) Performance and Operations in Toxic Environments; 3) Exposure to Death, Disasters, and Bodies; 4) Groups and Organizations in War, Disasters, and Trauma; 5) Individual Response to Disaster; and 6) Training for the Psychological and Behavioral Effects of the CBW Environment.

The following recommendations are derived from the extensive database, project observations and the meetings of convened experts summarized in the volumes. These recommendations are categorized by: Command, Medical Care, Performance, and Training. There is substantial overlap among the sections of the recommendations which indicate the close interplay among performance, health, and psychological responses in the CBW environment.

RECOMMENDATIONS

Command

1. Command policy must increase alertness to information flow and coordination between command, medical experts, and mental health experts in a CBW attack. The flow of information is critical in any combat environment. However, because of the contained environment of the SCPS-M and SCPS-II, contained base operations and protective gear, information flow will be restricted and substantial command attention will be needed to continue to receive the information necessary to make command decisions. Information flow will also serve to reassure troops and overcome the isolation of CBW which can increase the combat stress. Command procedures and doctrine should be developed with this in mind.

2. Command and medical policy should clearly specify the role of the medical officer in a CBW environment: to consult with the commander and to supervise treatment and medical evacuation.

3. Training should be directed to two different CBW scenarios: a) The first chemical attack which includes the element of surprise and heightened fear and stress. The psychological impact of such an attack includes the disorganization caused by panic. One must expect that chemical weapons will be used by surprise and that this will create such panic. b) The ongoing functioning during sustained CBW including repeated surprise attacks. High quality performance will be required despite high casualties. We must be able to sustain casualties and maintain the fighting edge.

4. Because the SCPS-M will be located close to the flight line, high numbers of casualties who might otherwise die prior to reaching the unit can be expected. This will have an impact on the medical personnel as well as on troops who must escort the personnel to the medical unit. Command policy and training must give particular attention to this morale affecting issue.

5. Command policy should be directed to providing as much information as possible to the troops about what is occurring in other areas of the combat zone. This will aid the individual in putting his/her experience in perspective and in decreasing the feeling of isolation induced by MOPP and SCPS units.

6. In the SCPS-II (non-medical units), it is important to provide for private space, clear definition of work spaces, variations in environmental stimuli, and designated spaces for eating, recreation, and conversation.

7. A group exposure of troops or individuals in the surrounding civilian community to a CBW agent may result in anger directed at the base and commanders. Command should develop procedures and plans for defusing this volatile situation.

8. Commanders must be sensitive to the problems and concerns of the troops regarding the CBW environment. Specific concerns include necessities such as water, decontamination and safety as well as issues of personal space.

9. Commanders need to recognize that the main reason that chemical weapons would be used against our forces would be primarily for their behavioral and psychological effects. They would be primarily directed to disrupting cohesion, command, control and the conduct of operations rather than just to the number of people killed or incapacitated. Protective gear and SCPS units themselves will make communication difficult.

10. Low dose exposure over time creates special difficulties for air base operations including detection, decontamination, and individual and group protection. In addition, one can expect heightened levels of anxiety inside SCPS units when contamination, even though of low amount, has occurred inside a toxic free area. Such scenarios need to be incorporated into training experiences and SOPs developed.

11. Special attention must be given to the development of policy around multiple exposures to nerve agents. Multiple exposure increases the risk of toxic effects since dosage can be cumulative.

12. Further data is needed on dosages of CBW agents which produce significant cognitive and affective disturbances when given as a chronic low dose exposure.

13. Studies looking at medical and psychiatric recovery following toxic exposure to nerve agents indicate that an individual may appear healthy, be sent back to duty, and then suddenly deteriorate. Exposure to nerve agents has been documented to have effects up to one year. Toxic behavioral and psychological effects of nerve agents persist and are potentially cumulative. The clinical and operational implications of these findings are not clear and require further study in order to develop definite command and medical policy concerning monitoring performance for the development of illness and for the return to duty after toxic exposure.

14. How soon a unit can be at full operational readiness, and how best to reconstitute units with high numbers of casualties are command areas for which insufficient information is available. Further research is needed on group and individual responses to and recovery from trauma and combat stress in order to provide policy guidance in this area.

15. The effects of combat stress, including the normal reaction to combat, may mimic the signs and symptoms of nerve agent exposure. This overlap in manifestations must be properly managed by both commanders and physicians and requires clear policy.

16. High chronic stress exposure may lead to subtle decrements in problem solving skills which may effect commanders and troops alike. Little is known about this area. Subtle alterations in the capacity to think logically and to problem solve resulting from high stress environments require further research to increase the database available for policy development.

17. Command must make decisions concerning re-exposing troops following low dose exposure. This should be included in training scenarios for commanders at all levels of military education and policy developed.

18. Exposure to nerve agents does not necessarily mean intoxication (contamination). It does not necessarily produce panic. This should be incorporated into command doctrine.

19. Medical personnel must train and understand their role in the prevention of panic. Medical personnel must take positive action to prevent panic responses among troops.

20. Group contagion of dysfunctional behaviors can be expected to appear and can adversely affect functioning in the CBW environment where one individual may lead a whole group to detrimental behaviors even when done out of altruistic concerns. A contagion may include not maintaining water discipline or several individuals seeing a threat on a radar scope during a time of high stress when no threat exists. Command policies are needed which will minimize contagion of detrimental behaviors in this high stress environment. At all levels of command, these should include the provision of accurate available information, development of redundant information sources for verification and rumor control, timely rest and respite, accurate performance of tasks and maintenance of water discipline and work-rest cycles. Further research is needed in this area.

21. Complaints similar to the symptoms of contamination can be expected from those who think they have been exposed. Discrimination between these complaints and actual exposure will be quite difficult for line personnel who must decide when to evacuate someone to the SCPS-M. Inappropriate self-administration of antidote and incapacitation may result. Command decisions about when a CBW attack has occurred and where will affect these behaviors and should be incorporated into policy on the release of information about a CBW attack.

22. Overdedication -- working beyond capacity with a lack of recognition of personal food, water, rest and respite requirements -- is a substantial risk factor because of increased errors and heightened risk for hyperthermia if in MOPP gear. In addition,

at extreme levels it may substantially interfere with an individual's or supervisor's performance and problem solving ability. Training to recognize this behavior at command and operational levels and a policy to encourage "self care" in these areas is needed particularly for commanders and NCO's. The airline policy of "unless you put your mask on first, you may never be able to help your child put his/her's on" is applicable to this problem.

23. Data from the few training exercises which have been performed in a CBW context indicate a 5% to 20% contribution to casualty rates from the simulated CBW environment and MOPP gear alone.

24. Behavioral and psychological responses to the CBW environment must be examined in the context of behavioral disturbances which would lead to fatal contamination. Therefore, removal of a mask during a training exercise should be treated by commanders as a fatal contamination and the individual should be responded to appropriately within the training exercise.

25. Appropriate commendations should be given by unit/command to recognize those individuals in units who functioned in mass casualty response teams. This is an important element of minimizing combat stress breakdown.

Medical Care

1. Alcohol use will be substantial following any unexpected CBW attack. This is a major concern because of the risk of dehydration when individuals are in MOPP gear. Alcohol use after a CBW attack requires medical policy guidance.

2. Simple and easily read and remembered information must be disseminated on the psychological and physical effects of CBW agents and on antidotes. The use of mnemonics to assist in recall should be encouraged.

3. The problems of low dose exposure require further research. Low dose exposure raises complicated issues concerning chronic exposure in the combat area, in aircraft and in SCPS secondary to off-gassing. Subtle cognitive distortions may appear. When to administer antidote is unclear. The information presently available does not adequately address this area. Increased stress and fear about low dose exposure may be a major stressor of any long duration CBW environment.

4. Because of the critical requirement for effective communication between medical and command leadership, greater numbers of career physicians should attend professional military education to increase their ability to collaborate and communicate with line leadership.

5. Line officers and NCO's need input on the medical aspects of CBW. Such education should be part of the NCO Leadership School, SOS, the Command and General Staff College and the War College.

6. A reliable and secure means of intershelter (SCPS) communication is necessary. A battery powered system of cables laid underground between shelters has been suggested. Designated runners should be available and would be the most reliable. Redundancy should be the rule.

7. The training of SCPS-M shelter managers is critical to operations in the SCPS-M and the management of staff and patients under acute and chronic stress.

SCPS-M shelter command requires management inside the unit and coordination with command on base.

8. Urgent attention must be focused on the provision of water and a reasonable microenvironment (temperature and humidity) as well as a mechanism for handling urine and feces while in MOPP gear. The "go in your pants" provision of a 12-hour work environment produces a loss of contamination protection of MOPP as well as demoralization among the troops.

9. Commanders, troops and medical personnel require briefings on normal responses to disaster and, in particular, normal responses to seeing and handling dead bodies in mass casualty situations.

10. Individuals involved in body handling following mass casualties should have limited exposure with periods of respite and relief. Records should be kept on those participating in the body handling process. Body handling can be thought of as an additional "toxic" exposure.

11. To the extent possible, all individuals should anticipate that casualty care and body disposal will be a part of their work. Areas should be promptly policed for dead bodies and body parts. Bodies should be quickly placed in body bags. Research is needed to better understand the stress and recovery from these exposures and to make recommendations on whether this task should be handled by special units with appropriate replacements or should be distributed throughout all personnel.

12. Individuals skilled in the human responses to death and tragedy (mental health workers, hospital staff, chaplains, family services workers) should be placed at or near the site of mass casualties to work with recovery and clean up personnel to open channels of communication and self-referral.

13. Commanders and support troops (including firemen, rescue and SPs) are frequently overlooked as high stress occupations when faced with mass casualties.

Medical personnel must be alert to stress symptoms in these neglected populations.

These are high risk populations with high rates of casualties.

14. Leaders should be instructed in "grief leadership." The commander leads his troops at times of grief through the appropriate recognition of the loss, provision of respite when possible, and orientation to the new task as conditions and his/her troops recover. Commanders need instruction in these grief leadership functions.

15. During lulls in the attack, after rest and replenishment, debriefing and opportunities for release of emotional tension and cognitive integration of the experience through structured and unstructured talk sessions should be available. SCPS units should be designed to provide for intermingling and social areas for relaxation and talk to Research is needed on debriefing as a technique to prevent the development of illness and/or effect more rapid recovery and return to performance levels.

16. During times of respite following mass casualties, physicians (particularly those at the front door, e.g., family practice, GMO, ER) must be alert to patients presenting with somatic complaints, depression and/or alcohol abuse who may in fact be suffering a stress reaction.

17. The day-to-day operation of the SCPS-M requires attention and the development of SOPs. This has implications for the organization and training of personnel who function within the SCPS-M.

18. An internal command structure for operation of the SCPS and the SCPS-M is necessary to organize group functioning and decrease combat stress.

19. The provision of clocks or other ways to identify time passage is critical throughout the contained environment of the SCPS.

20. The control and monitoring of information flow into the SCPS units is important for the relief of stress and anxiety and maintenance of a realistic perspective on the ongoing battle. Information overload, as well as lack of information and rumors,

can be a problem. Procedures for obtaining, verifying and maintaining information are needed.

21. Sleep discipline is important to the SCPS-M personnel and maintenance of their performance. Breaks should be scheduled and followed. Preset work shifts should be adhered to since one of the symptoms of exhaustion is not knowing when to quit.

22. Within the SCPS-M, attention should be paid to variation in food and environmental stimulation including the use of color, sound, and smell when possible.

23. Casualties coming into the SCPS unit will have contamination not only of their clothing but of their bodies as well. Training to manage this contamination and exposure as well as familiarity with the risks and lack of risks involved is necessary for medical personnel.

24. The importance of adequate fluids while operating in the SCPS-M should be emphasized. Caffeinated beverages and alcohol should be avoided because they are dehydrating.

25. Medical personnel should have extensive training in the management of hydration and electrolyte balance under these conditions. The use of oral rehydration and/or parenteral fluids should be a carefully balanced option.

26. For those personnel who will man the SCPS-M ongoing medical training is necessary in the management of mixed casualties: nerve agent and mustard agent exposure, burns, blindness and projectile injury.

27. Operation in the SCPS-M requires discipline, conservation of energy, and elimination of unnecessary activity. Some troops will find this inactivity difficult. In order to avoid indiscriminate behavior, training to tolerate inactivity is important. The supervision of well motivated NCOs is critical to controlling the disruptive effect of boredom.

28. For those people who will be sent back to duty after having entered the SCPS-M, the SCPS-M facility provides a time when they will be out of MOPP gear. From the point of view of battle stress, a meal, preferably a hot meal, will greatly aid in keeping an individual going. Rest and replenishment should be one of the goals of the SCPS-M.

29. Casualties entering the SCPS-M will be distressed and often confused. Procedures must be developed to provide simple instructions and guidelines, orally as well as written on the panels of the SCPS walls, which can be easily read by personnel and casualties.

30. Triage, while in MOPP gear, is a special problem and requires extensive research. At present it is not clear that it can be done effectively.

31. Following the trauma of combat, to the extent possible, spouses should be appropriately briefed and informed through base media in order to obtain accurate information and be better able to provide support to the active duty member as a part of stress recovery.

32. The availability of water in the SCPS-M and the SCPS II should be closely examined. The importance of water within the SCPS is both for hydration and decontamination. In addition, however, the psychological experience of the availability of water to deal with fears of contamination should be recognized. The provision of limited amounts of water will heighten the degree of stress in those individuals within the SCPS.

Performance

1. Behavioral and psychological responses to nerve agents can be of a subtle nature including disturbances in memory, impaired concentration, irritability, and confusion. Distinguishing these from stress responses and from hyperthermia is difficult. This will lead to potentially high levels of referral by commanders and buddies who may be concerned about their compatriots. Commanders and NCOs require training and education on performance assessment in CBW environment.

2. Further data is needed from empirical studies of combat, disasters, and tragedies to better develop the empirical database on individual and group responses to such events. Issues of both health and performance require further study.

3. Long-term consequences of acute nerve agent exposure require further study in order to better understand the issues of return to duty following contamination. Studies concerning chronic exposure to nerve agents will be important for individuals operating in the SCPS-M where some contamination within the unit is inevitable as well as for troops operating within aircraft where, again, some contamination is inevitable.

4. Activity and the perception of control are important to recovery and return to "normal" following combat. In a CBW environment, individuals and groups should be kept busy with tasks directed towards return to normal routines. Structured tasks with others are important. Excessive isolation of individuals should be discouraged.

5. There is considerable variation in behavior in high stress environments both in terms of individuals and organizations. Some individuals may become more resilient to subsequent threat or attack after exposure. Increased group cohesion can be expected as well as potential loss of cohesion in some units. Differences and conflicts will be put aside in some units and magnified in others. Commanders and NCO's need to be trained in handling these performance affecting outcomes.

6. Further study of what occurs within groups in high stress environments is necessary.

7. One's perception of threat and risk in the CBW environment directly influences feelings of fear and terror at the individual and group levels and also at the level of leadership. The provision of adequate and accurate information is critical.

8. If contained for sustained periods of time (days) within the SCPS-II and SCPS-M units, small group issues can be expected to increase. These may include increased concern about individual safety, contamination and competition. Such tensions may be evidenced by concerns in other areas including interpersonal disagreements. Commanders and supervisors need training in recognizing and effectively dealing with these management issues in a contained environment.

9. Dealing with dead bodies and maimed individuals is an extremely stressful experience particularly for the untrained and the young adult (who comprise most of USAF troops). Nearly all studies indicate that dealing with dead or injured children is one of the highest stressors. The CBW environment and close proximity of dependents will make this a likely event. Commanders need to recognize this as an aspect of work stress. Medical personnel need to include exposure to this stressor as part of medical history.

10. A number of factors related to individual backgrounds may predispose particular individuals to increased stress. However, it should be remembered that given a high enough stress most individuals will experience some symptomatology. The vast number of people will respond well in high stress environments.

11. Isolation should be avoided following combat events and/or exposure to massive death. Combat units must be debriefed, information shared and rest and respite in group areas made available. Communication with family to the extent possible should be encouraged following a CBW attack in order to minimize the degree of stress induced by concerns about family.

12. Disruptions in the CBW environment can be caused by the wish to go home and the proximity of families. Training should include dealing with these issues.

13. Cognitive alterations in high stress environment, including the tendency to see what is familiar and expected and overlook the unusual, to assume one has found the correct solution, and to be susceptible to behavioral contagion, require further study.

Training

1. Training for commanders should include training in the reconstitution of squadrons, wings, and units after heavy losses.
2. The issues involved in how one reforms a unit which has suffered substantial casualties in order to maximize morale, health, and performance requires further study.
3. Exposure to nerve agents can lead to the appearance of subtle problem solving crutches to overcome memory loss. Commanders should train to identify these behaviors as an indicator of CBW intoxication.
4. Provision of information concerning what is expected can help lessen anticipatory anxiety. This information should be provided in a manner which will minimize contagion and panic and maximize the provision of helpful information. Realistic training can provide further information on the likelihood of psychiatric casualties, panic attacks, premature use of injectable antidote, dehydration, heat stress, and personality inflexibility in the CBW environment.
5. Training exercises should include the expectation that command and communication will be disrupted at the individual and unit levels.
6. Introversion and withdrawal may occur in some individuals as a response to the contained environment of the SCPS and the use of MOPP gear. Therefore, the maintenance of communication, both between units and between individuals, must be actively encouraged as part of training. Creative communication alternatives such as the tap code used by POWs should be encouraged in the CBW environment to enhance communication.
7. Actual heat casualties during exercises often are the result of faulty estimates of workload intensity and individual physical limitations. Group contagion of behaviors and overdedication to the group may also interfere with recognition of physical limits causing inaccurate assessment. Training for the CBW environment should include: the

assessment of workload intensity and awareness of those items which interfere with its accurate estimation by individuals and commanders.

8. Work/rest cycles are a critical aspect of the prevention of contamination and performance breakdown. Carelessness can be fatal. Training exercises need to be extended sufficiently to provide for training in the problems of maintaining work/rest cycles

9. Alcohol or drug use can adversely affect functioning in the CBW environment, i.e., heat stress, fatigue, and dizziness while performing in MOPP gear. In an actual CBW scenario, some individuals will have ingested alcohol prior to the attack. Training should include early recognition of individuals who may be at risk while functioning in the SCPS-M or on the flight line in MOPP gear and education to decrease alcohol use when CBW attack is anticipated.

10. The familiarity of troops with the SCPS-M environment may be important to decreasing panic should they become a casualty and be required to enter this unit. Anxiety about entering the shelter can be decreased by learning about and being familiar with it. Non-medical troops should be introduced to the SCPS-M either through actual work in the shelter or, more likely, through videotape presentations in training.

11. Staff training for the CBW environment should include training in the handling of combat psychiatric casualties within as well as outside of the SCPS-M.

12. The management of problems within the SCPS needs to be addressed in training. These should include insomnia, heat stress, cognitive disturbances due to sensory deprivation, and the problems of substance abuse.

13. Group cohesion within SCPS units (medical and non-medical) can be enhanced by commonality of task and previous training as a group. Units which will share SCPS should train together.

14. Decisions about how to handle individuals who refuse to leave the protection of the SCPS-M or SCPS-II require consideration and the development of SOP's. SOP procedures should also be developed to simulate the possibility that individuals inside the SCPS-II or SCPS-M during a major attack will be reluctant to admit others.

15. Training exercises should include "decisional conflict choices" for commanders to respond to. (e.g., seeing some individuals run away, having security police at the gates with dependents wanting to get in, having individuals within the SCPS unit who refuse to open the door, having individuals within the SCPS unit who refuse to go out).

16. Problems of further contamination are created by off-gassing. This can contaminate care givers and toxic free areas. Training exercises in the SCPS units should include the off-gassing issue, e.g., breakdown of adequate ventilation or contamination flow across areas.

17. Buddy care in the CBW environment is critical. Buddy care must include a) encouragement for hydration and rest, b) provision of talk and communication despite the wish to be quiet since MOPP gear makes talking difficult, and c) adequate training on when and when not to use antidote.

18. Teaching troops to carry out buddy aid in a CBW environment requires training for accurate judgment in utilization of antidote. The possibility of "sharing your antidote" with your buddy can lead to increased risk for psychosis in the casualty who receives the additional antidote. This scenario should be incorporated into training in order to decrease its possibility.

19. Procedures for the interface between first echelon (buddy care) and second echelon (SCPS-M) are needed. Who controls the flow into the SCPS-M? Who is the first echelon decision maker who decides to evacuate to the SCPS-M? What criteria will be used by the non-medical NCO or officer?

20. The use of live chemical agents in training by the Army raises important issues. Data indicate that heightened levels of concern and risk are experienced by the trainees. The provision of realistic training is important. Whether the use of live agents significantly contributes to learning is less clear. Further study is needed.

21. Operational testing and evaluation of the SCPS units as well as future chemical decontamination units should include failure mode evaluations. Failure mode evaluation is not the same as merely operating a facility and seeing if it works. Rather, an individual should be designated to determine how to "break" the facility. This should include not only equipment but also personnel and procedural issues, such as the death of a number of patients while still in the decontamination area or the occurrence of a psychotic episode in this area. Additionally, this should include the loss of communication between units.

22. A procedural failure mode evaluation should be instituted that would include the issue of human system operations in failure mode and how that impacts on engineering requirements as well as SOPs.

23. Training must include both the development of routinized repetitive skills as well as training for the unexpected. Failure mode training scenarios -- scenarios which include the unexpected break down of hardware or procedures -- are important to the development of problem solving skills for medical personnel in the SCPS-M.

24. Extensive training in the use of antidotes and differentiation between heat symptoms and those resulting from exposure to chemical agents is necessary. It is unlikely that antidote will be used appropriately if this is left to an independent decision without extremely routinized decision criteria.

25. Consideration should be given to changing the language in which we discuss "contamination" to that of "intoxication." "Intoxication" tends to indicate an individual who has received an overdose of a substance and can be treated. "Contamination" has a

focus on needing to avoid what is present. We should train to treat "intoxication" with chemical agents.

26. The maintenance of morale for those individuals who must maintain and operate both the SCPS and the SCPS-M should be a part of training for SCPS unit commanders.

27. Realistic training might include informing troops in a training exercise that 50% of the masks will not work prior to their entering a tear gas environment. They must then work together to identify which masks those are -- testing filters and looking for broken seals -- before they enter the tear gas environment.

28. The SCPS-M unit should be used in training in order to increase familiarization, comfort, and cohesion. Exercises in and inspection of this unit are not the same.

29. Concerns over whether a combatant's family is safe or exposed to CBW agents will be prominent. The provision of information about their safety will affect the performance of the troops in the CBW environment. The ability to provide information about family members should be built into the training exercises.

30. The role of the SCPS-2 as a possible area for sick call should be examined.

31. Retraining and re-exercise of the group which will operate the SCPS-M is important to maintaining performance and familiarity with this unit. This will be difficult given the approximately 30% turnover per year in staff at bases overseas.

32. Training exercises must incorporate failure/breakdown of the SCPS units into scenarios in order that medical and line personnel can develop skills in handling the needs of individual and group protection and health in the face of such a crisis (e.g., doors will not close, air conditioning failure).

33. Unit identification on MOPP gear will be particularly important when teams who are unfamiliar with each other are working together. The development of ways to

provide identifiers on MOPP gear without compromising the integrity of the suit is important.

34. Training to maintain the life support aspects of the SCPS and SCPS-M units is an important aspect of training for all those within the unit (e.g., air conditioning breakdown, food, inadvertent contamination).

35. During times of disaster, one can expect distortions in time to be experienced as well as to see feelings where they are unexpected. The phrase, "look again/think again" may be a helpful phrase to incorporate into training scenarios in order to encourage troops to be alert to these cognitive distortions.

36. Commanders and their staff need to be educated to the "first hypothesis phenomena" - the tendency under stress to act prematurely without adequate problem analysis. Reevaluation of the consequences of a course of action must be continuous. The tendency is to stop after finding one solution and assume that it is the correct one. Training exercises need to incorporate the phrase "think again" to help counter this behavior.

37. Video tapes and discussion of dead bodies and responses to dead bodies are an important aspect of training for troops as well as medical personnel.

38. Training through exposure to real disasters can be a major contribution to the training of medical and line personnel in the handling of the CBW environment. Such opportunities should be sought out.

39. The training of one non-medical NCO in troop units (approximately 1:5 - 10 men) in advanced first aid is important to developing first aid capability within squadrons, wings, and crew units. The Army Combat Lifesaver Program is an example of such a program.

40. Families should be thought of as a "contingency resource" during times of CBW attack. Plans for how they could be useful during an attack should be developed rather than seeing them as a liability.

41. Claustrophobia can be expected to occur in a certain percentage of individuals both in MOPP gear and in the SCPS units. Non-medical as well as medical personnel, particularly NCO's, should be trained to "talk a person down" so they do not break protection and/or remove them to a safe area rapidly.

42. Medical personnel must be trained to keep patients informed of what is going on. Similarly, in troop units, individuals must train themselves to speak and communicate despite the increased physical exertion required.

43. A training scenario should be developed which includes heightened concern about dependents who are in the area.

44. Confidence in equipment is critical to performance. Troops need to have equipment available, and train in and play in their equipment so they know its strengths and limits.

45. To the extent possible, people in the casualty recovery area should be given an active task to keep them focused rather than being left passive with their injuries.

46. It should be remembered that one shot learning is in general, not effective. If training is to be effective, it must be repeated and should be realistic.

47. It is necessary to encourage pilots to specifically work towards maintenance of cohesion with their ground crews. MOPP gear and CBW will decrease interchange between fliers and non-fliers. In order to maximize performance and cohesion, hand signals and training to encourage communication at this critical interface should be developed.

48. Non-medical supervisors need to be taught how to control hyperventilation (in response to MOPP gear) and the inappropriate use of antidotes.

49. Motivation during combat is substantially different than that during peacetime. Training should focus on trying to develop motivation similar to combat during the training exercise. These motivations include concern for fellow troops and

accomplishment of task. These motivations are frequently different from those which are present during peacetime training exercises.

50. Training for "no action" as a possible appropriate response to a CBW scenario needs to be incorporated into training exercises. This may be particularly difficult for those individuals prone to active engagement. Scenarios should be developed where the correct action is no action or delayed action.

51. Training should include training to "touch." Touch can be an important form of communication when oral communication is difficult.

52. Medical and non-medical personnel require training -- discussion, videotapes and scenarios -- for the experience of helplessness which will be present. Such training should emphasize the normality of this feeling to decrease the panic which can be associated with it. Helping behaviors driven by the feeling of helplessness can be prone to errors.

53. Individuals should be trained to use clocks. The distortion of time present during high stress environments can lead to performance breakdown.

54. Body handlers should be trained to not look at faces and hands. Looking at faces and hands tends to increase the degree of stress experienced by the individual.

55. Dependents should be included in base wide CBW exercises. This should include dependents showing up at the gate, using dependents as additional resources, movement of dependents.

56. The high physiologic work load at various SCPS decontamination areas requires that individuals rotate and learn the task of other assignments within the SCPS-M decontamination areas. This will increase flexibility and reduce organizational rigidity.

57. In MOPP gear, fewer cues are necessary to recognize and feel related to a person one knows well. This emphasizes the need to train as units. Training should include techniques for the recognition of people in MOPP gear.

58. Training exercises in the SCPS-M should be longer than the four hours frequently provided in order to get beyond the initial adaptation period and develop some experience with the ongoing sustained operation of the unit.